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The increase in electric conductivity of the egg at the beginning of development may be due to increased permeability to ions or to the liberation of ions from (physical or chemical) combination with proteids, but it is improbable that the latter occurs to any great extent, as no dilution of the egg contents (swelling of the egg) takes place.

We may conclude, then, that, at the beginning of development, the egg becomes more permeable to ions and thus the dissociated carbon dioxide is liberated. This decrease in an end product of oxidation in the egg allows an acceleration of oxidation and the consumption of oxygen. The decrease in oxygen leads to its increased absorption.

J. F. McCLENDON

BOCA GRANDE KEY, FLA.,
June 30, 1910

GEOLOGY AND GEOGRAPHY AT THE BOSTON-CAMBRIDGE MEETING

IN accordance with the custom of the past few years, the officers of Section E did not ask for titles of any papers to be read at the Boston-Cambridge meeting, for the reason that the Geological Society of America, the Paleontological Society and the Association of American Geographers held meetings for the reading of papers. The meetings of these special societies occupied all the time from Tuesday morning, December 28, to Saturday night, January 1.

There were twelve titles of papers presented to Section E. These papers were read on Monday, December 27, in the University Museum, Cambridge, and were listened to by some fifty to seventy-five geologists and geographers. Between the morning and afternoon sessions many of those present enjoyed lunch at special tables in Memorial Hall.

SECTION E

The following officers for the Boston-Cambridge meeting were elected: member of council, Professor A. P. Brigham, and member of general committee, Dr. G. Otis Smith. The sectional offices were filled by the election of Dr. John M. Clarke, state geologist, Albany, N. Y., as vice-president for the ensuing year, and Dr. C. Willard Hayes, chief geologist of the U. S. Geological Survey, to serve as member of the sectional committee for five years. In accordance with a change

in the constitution adopted at this meeting, the following become members *ex officio* of the sectional committee: Arnold Hague, president of the Geological Society of America; Dr. E. O. Hovey, secretary of the Geological Society of America; Professor H. C. Cowles, president of the Association of American Geographers, and Professor A. P. Brigham, secretary of the Association of American Geographers.

As retiring president of the Paleontological Society, Dr. John M. Clarke found it necessary to decline the honor of his selection as vice-president of Section E. The sectional committee of Section E have therefore nominated Professor Christopher W. Hall, professor of geology at the University of Minnesota, Minneapolis, to be the next vice-president.

The sectional committee of Section E is constituted as follows: retiring vice-president, Reginald W. Brock; vice-president, Christopher W. Hall; secretary, F. P. Gulliver; preceding secretary, E. O. Hovey; for one year, E. H. Barbour; for two years, J. B. Woodworth; for three years, F. B. Taylor; for four years, G. K. Gilbert; for five years, C. W. Hayes; president Geological Society of America, Arnold Hague; secretary Geological Society of America, E. O. Hovey; president Association of American Geographers, H. C. Cowles; secretary Association of American Geographers, A. P. Brigham.

VICE-PRESIDENTIAL ADDRESS

The retiring vice-presidential address of Mr. Bailey Willis on "Principles of Paleogeography" was given on Tuesday evening in the Geological Lecture Hall of the Massachusetts Institute of Technology at eight o'clock. This was published in *SCIENCE*, N. S., Vol. XXXI., p. 241.

HARVARD COLLEGE OBSERVATORY

Professor E. C. Pickering invited the geologists and geographers present at the meeting to visit the Harvard College Observatory in Cambridge on Monday afternoon from three to six. Professor E. C. Pickering and Professor W. H. Pickering met parties of geologists and geographers, numbering from ten to twenty, and turned them over to the various members of the scientific staff of the observatory. All portions of the observatory were open to inspection, and while some of the visitors spent most of their time in the study of the astronomical photographs, others were more interested in the study of variable stars, while still others cared more to see the methods of

observation with numerous telescopes, and all were given an opportunity to view the planets, Saturn, Venus and Mars; and variable, double and other stars.

Professor Pickering pointed out that many of the subjects with which astronomers have to deal are related to those of the geologists. He said that important results may be secured by cooperation, and there is reason to believe that a fund that could be used for geological work would be as valuable as it would be in astronomy. For example, a college professor in geology is often unable to carry on investigation for lack of the proper material needed for his work, for the lack of a trained assistant or for lack of the means of publication. He becomes absorbed in the duties of teaching, where a small sum given to him would enable him, in his leisure hours, to carry on work of the greatest importance. Great advances can be made in any science by using money in this way, giving it to scientific men who can work at home among their own surroundings much more advantageously than if they were taken to another city, in an institution devoted to such work.

Three methods of discovering variable stars were exhibited, *i. e.*, by means of their spectra, by means of a series of successive images taken the same night and by superposing a negative upon a positive of a negative taken on another night.

The field of work occupied by the observatory is a very broad one. It has occupied a station in Peru for the last twenty years to photograph the stars not visible in Europe or the United States. Last year it sent an observer to South Africa to see if the atmospheric conditions there would be better than they are in South America. The complete plan if carried out would involve securing a large tract of land in the place having the best climatic conditions, probably in South Africa, offering sites to any observatory that might wish to establish a station there. A large telescope should then be provided, and photographs taken with it which should be guarded as the property of the world and not of a single institution. These could be distributed among the astronomers who could make good use of them, and who would thus be provided with material, which they themselves could have obtained only by an expenditure of hundreds of thousands of dollars.

Various questions were asked Professor Pickering by his guests, which he declared himself unable to answer, saying that he considered his function the accumulating of facts, particularly

those relating to the stars, which he hoped would thus furnish the material for the establishment of theories which might hereafter be advanced, those having special bearing on certain problems which have a connection with geology and astronomy, such as the formation of worlds, the distribution of the stars, and the existence of an absorbing medium in space.

RECEPTION GIVEN BY PROFESSOR JAGGAR

On Monday afternoon Professor T. A. Jaggar, Jr., invited the geologists and geographers to a reception at his home at Chestnut Hill. Owing to a snow storm of unusual depth for the region of Boston, transportation was very difficult, but with commendable zeal Professor Jaggar overcame the almost insurmountable difficulties caused by the heavy fall of snow, and those who reached his house enjoyed a most delightful afternoon and evening.

ABSTRACTS OF PAPERS READ BEFORE SECTION E

Some Physical Features in China: CHARLES K. EDMUNDS, Baltimore, Md. (Read by title.)

(a) Some recent views of the limestone pinnacles and palisades of the Fu River valley, Kwongsai.

(b) The locks of the Grand Canal between the Yangtze and the Yellow rivers, and their operation.

(c) A recent break in the Yellow River dyke, and its repair.

The views accompanying this paper were obtained during field work for the department of terrestrial magnetism, Carnegie Institution of Washington, during 1907 and 1908.

Structure, Origin and Stratigraphic Significance of the Shawangunk Grit: PAUL BILLINGSLEY, New York City.

The Shawangunk grit forms the ridge known in New York as the Shawangunk Mountains, in New Jersey as Kittatinny Mountain, and in Pennsylvania as Blue Mountain. This is a monoclinical ridge for the greater part of its length.

The Shawangunk grit rests unconformably upon the Martinsburg shales, and is separated from the overlying High Falls red shale by transition beds in the south, and a disconformity in the north. It varies from a coarse, poorly assorted conglomerate to a fine sandstone or even red shale. The details of its structure bedding, lithologic character and fossil content suggest a probability of its non-marine character, and point toward a torrential or alluvial-fan mode of origin.

Stratigraphically, the Shawangunk grit may be called early Salina in age. The red beds into which it grades upward indicate increasing aridity of climate, compatible with the suggested desert origin of the salt and gypsum deposits of this age in western New York and Michigan.

Microseisms: OTTO KLOTZ, Ottawa, Canada.

It is found that disturbances are registered by the seismograph, which are not due to earthquakes. They have been noted in all parts of the world, and are more frequent in winter than in summer. They last sometimes for days with considerable regularity, presenting a "sawtooth" appearance, and have a period of about five seconds. They have been examined by the writer for the past three years, and he has found that they are essentially due to barometric pressure, more specifically to areas of low barometer with steep gradients. Furthermore, these areas of low barometer are most effective when they rest or pass over water, *i. e.*, the ocean. A corresponding area of low barometer even with steep gradients over land, approaching the earthquake station has little effect in producing microseisms. Wind affects the seismograph, but in a different manner. Wind effect as shown by microbarogram has its counterpart on the seismogram, but not as microseisms.

In Europe one should find, in conformity with the above deductions, microseisms recorded *before* the arrival of the low, as the storms travel from west to east; in eastern America passing from land to water, and in Europe from water to land.

High Terraces and Abandoned Valleys of Western Pennsylvania: E. WESLEY SHAW, Washington, D. C. (Read by title.)

The features indicated by the above title are the well-known gravel-covered rock shelves found along the large streams of the region about 200 feet above present stream channels. They have been ascribed by different men to submergence and marine erosion; to a large ice dam at Cincinnati or Beaver; to normal stream work; and to huge local dams of ice. The data gathered by the present writer seem to indicate that the high terraces and abandoned channels developed as a unit through the overloading of the Allegheny in early glacial time and a later redissection. The aggradation of that stream caused every tributary to aggrade, and the coarseness, slope and other characters of the deposit indicate that the tributary streams built up as rapidly as the overloaded master stream. As the stream beds rose they

reached the heights of one after another of the lowest places in divides between small tributaries, and at such times and places the currents of the rivers were divided and the cols occupied. When final redissection began the rivers chose the channels momentarily most desirable, and thus many parts of valleys were abandoned.

Glacio-lacustrine and Post-glacial Features of the Connecticut Valley near Hanover, N. H.: J. W. GOLDTHWAIT, Hanover, N. H.

The stratified drift deposits of the Connecticut Valley near Hanover, N. H., and the surface features developed on them by the sculpturing of tributaries to the Connecticut River furnish material which is of more than merely local interest.

An extensive clay plain, formed of thin-bedded silts of very uniform composition, is believed to be the heavily aggraded floor of an extinct lake of the Champlain stage, not a river deposit.

A delta of coarse gravel and sand, built by a small tributary stream at its debouchure into this lake, fixes its water level at 560 feet above the sea, or 30 to 60 feet above the clay plain.

There are features of post-glacial river erosion within the plain, including terraces, which are persistent up and down the valley, and are not due to local protection of ledges. There are entrenched tributary streams of various sizes, whose abandoned valley floors point clearly to temporary baselevels between the level of the Champlain Lake, 560 feet, and the Connecticut River, 375 feet. The chief of these are at 450 feet and 420 feet. Three working hypotheses for these stages are suggested: (a) rock barriers farther down the Connecticut Valley, which the master river has removed or swung off from; (b) tongues of ice or ice blocks which impounded the waters for a time, during the Champlain stage, and (c) postglacial regional upwarping which was not single and continuous, but consisted in a series of uplifts separated by pauses.

Large-scale contour maps made by students of the Thayer School of Civil Engineering furnish precise data for comparing the heights of terraces on different tributaries, up and down the valley.

The Shorelines of the Glacial Lakes in the Vermillion Quadrangle, Ohio: FRANK CARNEY, Granville, Ohio. (Read by title.) No abstract received.

A Quantitative Measure of Maximum Arid Deflation: CHARLES R. KEYES, Des Moines, Iowa. (Read by title.)

In a normally moist land the volume of erosion

during any period is measurable from some up-raised peneplain level; its depositional equivalent is usually much more difficult, and often impossible, to estimate.

When first recognized in its proper and vast proportions, erosion by the winds in desert regions appeared to have no downward limit corresponding to the baselevel of general stream-erosion. This aspect of the problem became the most serious obstacle to its solution. More recently a baselevel of eolic erosion has been found that is as sharply defined as normal peneplanation.

Inasmuch as general wasting of the land is measurable either by the amount of erosion or by the deposition products, but rarely by both at least in the same geographic province, later geologic time units are best estimated by the results of the erosional processes and the earlier time-intervals by sedimentation products.

In southwestern United States the products of the two opposed processes are in juxtaposition and are in a remarkable manner sharply contrasted. The character of the erosion is not, however, of the normal aqueous type, but of the eolic variety. It is particularly noteworthy at this time, on account of furnishing quantitative data on the extent and rate of eolic activities under climatic conditions stimulated solely by aridity.

This region of deserts has been already treated as a direct product of eolation without material interference from water action. The original surface at the initiation of the arid cycle is assumed to be essentially a peneplain extensively upraised. The main remnant of the latter is regarded as being the high Mesa de Maya in northeastern New Mexico. This level is also approximately the summit level of the majority of the Desert ranges. Below it the present plains level lies about 5,000 feet, the plains level being also about the same distance above sea level.

The depositional equivalent of the vast deflative work throughout the region appears to be best represented by the 5,000 to 8,000 feet of Tertiary boraciferous clays and sands occupying the Santa Clara, Mojave and Death basins of southern California, and by the thick, but as yet unmeasured, deposits of similar nature filling the great trough of the Californian gulf. These deposits are now believed to be mainly desert dusts blown into the adjoining shallow seas. Since they are subdivisible into Eocene, Miocene and Pliocene sections, as well as into several Quaternary terranes, quantitative data for the measurements of the several

eolative phases of insolation, deflation and aëro-position are at once made available.

Destruction of the Drumlins in Boston Harbor: GEORGE C. CURTIS, Boston, Mass. (Read by title.)

The disappearance of the glacial islands of Boston harbor may be traced both by historical and by geological records. Transitions from the most perfect specimens of intact drumlin form through successive stages of wasting away, from mere nippings of their bases to last vanishing remnants of till, and further to outlining boulders as witnesses of former location, are exceptionally abundant in Boston Bay. Typical cases are selected from the harbor examples to illustrate the processes of marine erosion.

The Coral Island Bora Bora, and the Model as Illustrations of the Principles of Naturalistic Earth Relief: GEORGE C. CURTIS, Boston, Mass.

Bora Bora is a small island in the Society group, southwestern Polynesia. It is surrounded by a barrier reef of living corals. The island was early studied by Lesson, Darwin and Dana, and later by A. Agassiz. The writer made a detail survey and a series of deep-sea soundings a mile off the reef, about the entire island. The formations beginning with the deep sea, across the island shelf, barrier reef, reef flat, etc., to the central agglomerate peaks are taken up in order. Evidence of movements of elevation and depression are cited in this and other members of the Tahitian archipelago.

The model of the island, now installed in the coral room of the Agassiz Museum, for the construction of which the survey was primarily made, is considered as one of the pioneer works in this branch of geology, for the possible light it may be able to throw on the little-known principles of naturalistic earth relief.

The Geographic and Geologic Character of the "Sabana" about Caicara, Venezuela: T. A. BÉNÉDICT, Turners Falls, Mass. No abstract received.

Report of the Third Meeting of the Permanent Commission of the International Seismological Association held at Zermatt, Switzerland, August 30 to September 3, 1909: OTTO KLOTZ, Ottawa, Canada. (Read by title.)

Résumé of meeting, with reference to several of the principal papers presented there.

The Glacial Recession in Western New England: F. B. TAYLOR, Fort Wayne, Ind.

During the retreat of the Labrador ice sheet

across western New England the configuration of the ice front, as expressed in horizontal plan, was greatly influenced by the topography. The Hudson and Champlain valleys are relatively deep, and are substantially continuous as one valley from the lowlands of the St. Lawrence on the north to the Atlantic Ocean on the south. This great trough is bounded by mountain ranges on both sides ten to twenty miles back from its axis. Into the north end of this trough the ice poured in a powerful stream, and the easy path of flow which it found along the valley axis led it there to push southward many miles beyond the points where it overtopped the two flanking mountain ranges. Thus in every stage of advance and retreat there was a great, sharply pointed ice lobe projecting one hundred miles or more south of the general line of the contemporary ice front on the adjacent higher ground.

The land around the headwaters of the Connecticut River is high, being a continuation of the Green Mountain range. On this account the ice sheet did not enter the Connecticut Valley until it had overtopped and flowed down the east side of the Green Mountain range. Thus, although the Connecticut Valley in Massachusetts is nearly as deep and wide as the Hudson Valley, it held no great ice lobe. The ice came into the Connecticut Valley over the Green Mountain range from the northwest, and the whole region between the two rivers was domineered by the ice of the Hudson lobe.

Detailed studies in the Housatonic and Taconic quadrangles have disclosed the presence of no large or continuous terminal morainic deposits, but instead many small, scattered fragments in the valleys. These mark the places of the termination of small ice tongues, which crept forward a few miles into the valleys from the front of the main ice mass. Each such deposit marks a halting place in the retreat of the ice. By following the series of these morainic fragments through parallel and interlacing valleys a method of correlation was found by which it was possible to reconstruct the successive positions of the ice border. It was thus found that the general trend of the ice border in retreating across Berkshire County and adjacent areas was from northeast to southwest, and the general direction of ice movement was about south 40° east. This general trend marks the eastern limb of the Hudson Valley ice lobe, but the mountainous character of the region and the plastic adaptation of the ice to the topography caused the formation of

many sharp little ice tongues with equally sharp reentrant angles between them. Thus, at each halt, the border of the ice was intensely serrate. The slope of the small ice tongues varied from 100 to 120 feet per mile in some cases. The rate of rise along the general front, ignoring the smaller tongues, was something like 30 feet to the mile. In most of this region the successive halts are spaced by intervals of 3½ to 4 miles.

On account of the obstruction of natural drainage by the ice mass many small temporary glacial lakes were formed. One of the largest was Lake Housatonic, a sprawling, irregular lake, lying mainly between Lee and Glendale. One of the largest lakes of New England, however, occupied the valley of the Hoosic River, and is known as Lake Bascom. From first to last this lake was 25 or 30 miles long, and at Williamstown it was 500 feet deep. Numerous deltas were formed in it by mountain streams, and mark different levels of its waters. Outlets or points of overflow from this lake are well marked at several places and at different levels.

Glacial erosion in this region was in general very slight, and is conspicuous only on mountain tops and lesser saliences. Nothing was found suggesting over-deepening by ice action. The whole area is covered with immense numbers of boulders, but few were found that could be attributed to a source more than twenty miles back on the line of ice movement, and none that are traceable to the Adirondacks or any other point west of the Hudson.

Studies in the Ware and Quinsigamond quadrangles in central Massachusetts by W. C. Alden show fragmentary moraines of similar character, distribution and spacing, and seem to indicate a close resemblance in the manner of glacial retreat.

On Friday evening the Association of American Geographers met informally in Technology Union for a round table conference on the topic "The Organic Side of Geography, its Nature and Limits." The conference was led by Professor Albert Perry Brigham.

Owing to the illness of several of those concerned with the preparation of this manuscript the account of geology and geography at the Boston-Cambridge meeting has been delayed until this late date. The secretary makes his humble apologies to the geologists and geographers, and hopes that although delayed this account will be of interest to many.

F. P. GULLIVER,
Secretary Section E